[Fe/H] = 0.040 (TRAPPIST 1 Gillon et al. 2017)

$\Rightarrow$ [Mg/Fe] = 0.12 (Fig 1 Griffith et al. 2020)

$$[\mathrm{Mg/Fe}] = \log\left(\frac{\mathrm{Mg/Fe}}{(\mathrm{Mg/Fe})_\odot}\right)$$

$\mathrm{Fe/Mg} = 0.9 \Rightarrow \mathrm{Mg/Fe} = 1.11$

from Exoplex

$$[\mathrm{Mg/Fe}] = \log\left(\frac{\mathrm{Mg/Fe}}{1.11}\right)$$

$$\log\left(\frac{\mathrm{Mg/Fe}}{1.11}\right) = 0.12$$

$$10^{\log\left(\frac{\mathrm{Mg/Fe}}{1.11}\right)} = 10^{0.12}$$

$$\frac{\mathrm{Mg/Fe}}{1.11} = 10^{0.12}$$

$$\frac{\mathrm{Mg}}{\mathrm{Fe}} = (1.11)10^{0.12} \approx 1.46$$

$$\Downarrow$$

$$\boxed{\frac{\mathrm{Fe}}{\mathrm{Mg}} = 0.683}$$

$$[\mathrm{Fe/Mg}] = \log\left(\frac{\mathrm{Fe/Mg}}{(\mathrm{Fe/Mg})_\odot}\right)$$

$$= \log\left(\frac{0.683}{0.9}\right)$$

$$= -0.12$$

use table 2,
(closest value to ours is
$[Fe/Mg] = -0.134$
ours is likely off due to estimation

so, adopt $[Fe/Mg] \approx -0.134$

gives $[Mg/H] = 0.445$

Table 1 gives:

$[Si/Mg] = -0.017$ for $[Mg/H] = 0.445$

Eq. $$\frac{N}{M} = \frac{N_\odot}{M_\odot} \cdot 10^{[N/M]}$$

$Si/Mg_\odot = 0.9$ (Exoplex)

$$\frac{Si}{Mg} = \left(\frac{Si}{Mg}\right)_\odot \cdot 10^{[Si/Mg]}$$

$$= 0.9 \cdot 10^{-0.017}$$

$$= 0.86 \text{ or } 0.87$$

Density of planet (assuming uniform density)

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

$$\text{Volume} = \frac{4}{3}\pi R^3$$

Radius = $0.943\ R_E$, mass = $0.772\ M_E$

$R_E = 6378$ km $\quad M_E = 5.974 \times 10^{24}$ kg

$= 0.943(6378\ \text{km}) = 6014.45$

$$\text{Volume} = \frac{4}{3}\pi(6014.45)^3 = 9.113 \times 10^{11}\ \text{km}^3$$

$$\text{Density} = \frac{\text{mass}}{\text{volume}} = \frac{0.772(5.974 \times 10^{24}\ \text{kg})}{9.113 \times 10^{11}\ \text{km}^3}$$

$$= 5.061 \times 10^{12}\ \text{kg}/\text{km}^3$$

$1\ \text{g}/\text{cm}^3 = 1 \times 10^{-12}\ \text{kg}/\text{km}^3$

$$5.061 \times 10^{12}\ kg/km^3 \times \frac{1\ g/cm^3}{1 \times 10^{-12}\ kg/km^3}$$

$$= \boxed{5.06\ g/cm^3}$$

approx. density